TERRACE CONSTRUCTION

WITH SMALL EQUIPMENT

IN THE SOUTH

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MANY FARMERS can construct their terraces advantageously by using farm power and small equipment even though the work may be done more quickly and efficiently with experienced operators and large equipment. Light equipment, such as plows, fresno or slip scrapers, home-made or commercially built V-drags, small-blade graders or one-way disk tillers drawn by farm tractors, horses, or mules, can be used to construct satisfactory terraces if the farmer is willing to devote the extra time that the use of this equipment requires. Constructing terraces with small machinery makes a cash outlay unnecessary; and farm labor, power, and equipment can be utilized to advantage when not otherwise gainfully occupied. The most satisfactory construction procedure varies according to the type of equipment used and the nature or condition of the soil. Experience and perseverance are required to develop proficiency, and the amount of work involved may vary more than 50 percent owing to the differences in soil conditions, the equipment used, and the skill of the operators.

Before terraces are constructed, it is important that consideration be given to their use and to the necessity for supplemental conservation practices. Terraces form only a part of a well-planned soil conservation program. Supporting practices, such as soil-improving rotations, strip cropping, cover crops, and contour tillage should be employed to the fullest extent possible on terraced fields. When properly applied, constructed, and maintained, terraces are valuable soil conservers, but when improperly used they may hasten rather than retard soil losses. Further information on the use of terracing for conservation farming is given in Farmers' Bulletin 1789, Terracing for Soil and Water Conservation.

[1] Prepared in cooperation with C. L. Hamilton, agricultural engineer. B. H. Hendrickson and John R. Carreker of the conservation experiment station at Athens, Ga., and field project engineers assisted in securing the illustrations.

TYPE OF TERRACE REQUIRED

The drainage or channel-type terrace has proved most satisfactory for systematically intercepting and conveying surface run-off from cropland to stabilized outlets at nonerosive velocities. Since it functions primarily as a surface-drainage channel, forming a channel is of more importance than building up a ridge. The three main requirements of a satisfactory cross section are: (1) Ample channel capacity, (2) cross-sectional slopes flat enough to permit the operation of tillage equipment along the terraces without undue hindrance, and (3) economical construction costs. Constructing the terrace primarily, if not completely, from the upper side is the easiest way to meet these requirements.

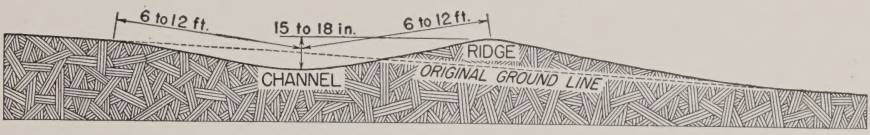

Figure 1 **Typical cross section required for a satisfactory channel-type terrace after plowing and settling.**

CONSTRUCTION

Terraces are first staked out so the channel lines can be marked and the proper grades and horizontal spacing provided. The uppermost terrace is then constructed, and after it each succeeding terrace down the slope. The top terrace should not only be constructed first; it should also be well constructed because the safety of the lower terraces depends on it. Sufficient work should be done during the initial construction operations to obtain a minimum channel capacity of 7 to 12 square feet. Terraces that are not completed to sufficient size at the outset remain a source of trouble. When it is necessary to distribute terrace-construction work over a period of time, the practice of completing the upper terraces first and building additional terraces during succeeding seasons is to be preferred to the practice of starting all the terraces at the outset and doing only a little work on all terraces each season. Terraces are finished by plowing to smooth out the slopes and enlarge the channel. Information on terrace plowing is given in a United States Department of Agriculture publication, Plowing for Terrace Maintenance in the South.

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Plow and Scraper

Slip scrapers or fresnos supplemented by a plow may often be used advantageously for terrace construction. The procedure is simple enough to be readily adapted and compares favorably with other methods in cost and in the time required for its completion. The soil is moved only once. Fill work and opening the terrace ends become a part of regular construction, and a complete terrace section with required capacity is secured as the work progresses.

In the heavier soils it is necessary to loosen the ground before beginning work with the scraper. A land at least 10 feet wide is plowed by bedding to a backfurrow 3 to 4 feet above the surveyed channel line. The finishing furrows at the outer edges of the land provide guide furrows, which are helpful in loading and dumping the scraper (fig. 2, *A*). In most sandy soils preparatory plowing may often be limited to plowing out two guide furrows (fig. 2, *B*).

The loading of the scraper is begun at the upper guide furrow (fig. 2, *C*). As it is drawn straight across the area between the two furrows a full load is obtained, which is deposited immediately below the lower finishing furrow to form the terrace ridge (fig. 2, *D*). On the return trip the team and empty scraper is driven across the finished section to compact the loose soil on the ridge. The scraper work is continued in this manner until the terrace has an adequate cross section.

Adequate channel capacity can be obtained by this method of construction, but usually it leaves the upper slope of the terrace ridge rather steep. Construction with a scraper should be followed by the one-land method of plowing. This will tend to flatten the upper slope of the ridge and locate the center of the channel in its proper place (fig. 2, *E* and *F*). The width of this land should be 12 to 24 feet, depending on the field slope (fig. 5).

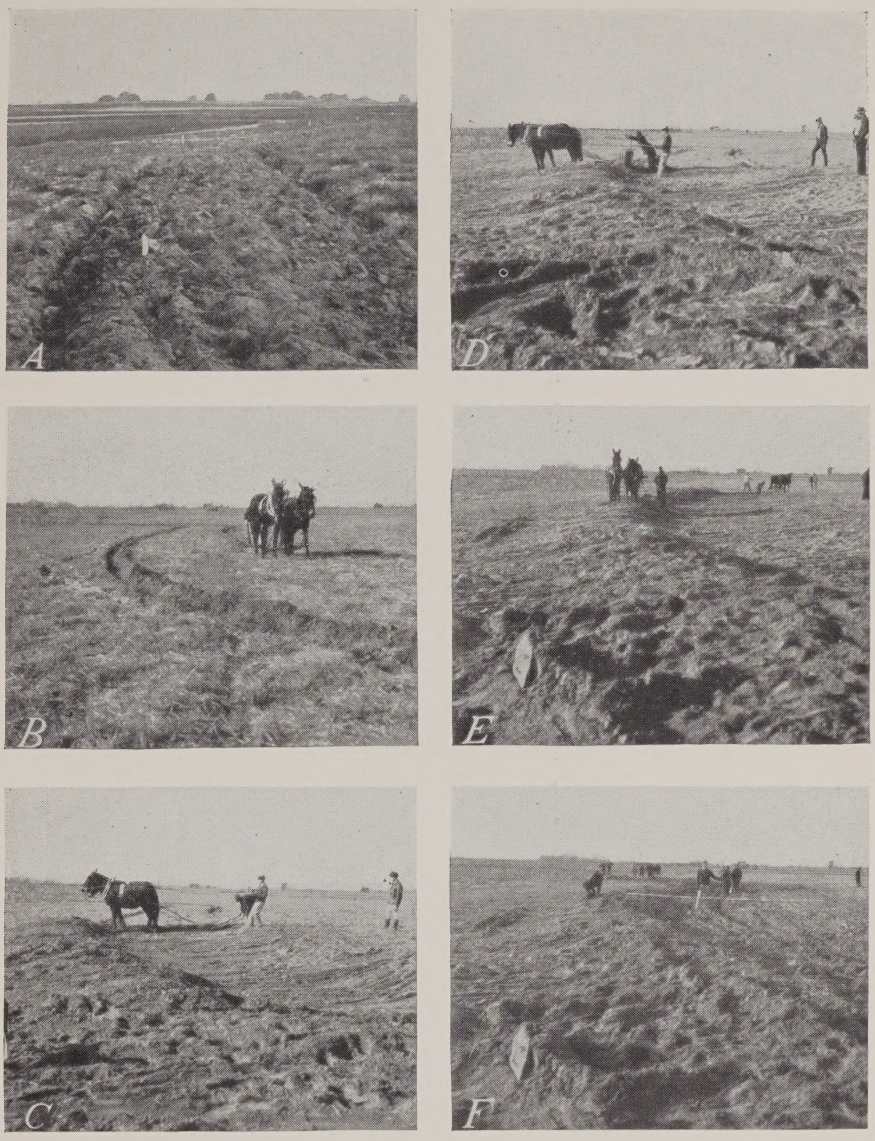

Figure 2

Terrace construction with plow and slip scraper: *A*—Plowing preparatory to scraper operation, *B*—plowing sandy soil where only guide furrows are necessary, *C*—loading of the slip scraper at the upper furrow, *D*—dumping at the lower guide furrow, *E*—the terrace section after scraper operation, *F*—the improved terrace section after the channel is plowed out.

Plow and V-Drag

Satisfactory terraces can be constructed with horse or mule power by using a good home-made or commercially built V-drag in conjunction with a plow. The home-made V-drag illustrated on the cover page was used in constructing the terrace shown in figure 3. The wings are 6 and 8 feet long and are constructed from 2- by 12-inch lumber with metal reinforced cutting edges. The angle between the wings can be adjusted for various soil conditions by changing the point at which the cross brace connects with the long wing. The drag is easily reversed by adjusting the position of the grab ring in the chain hitch so that the greater portion of the pull is directed to whichever wing is to work in the diagonal position. The short wing is generally worked in the diagonal position when a cut is being made and the long wing when maximum lateral movement of the soil is desired. An extension-board attachment is often used with commercially constructed V-drags to secure maximum lateral soil movement.

Terrace construction with the V-drag and plow may be begun by plowing a furrow to mark the channel line and two parallel furrows 9 to 12 feet on each side of the channel line (fig. 3, *A*). This distance may be reduced slightly for field slopes of more than 6 percent. The tendency for a ridge to form at the upper edge of the channel will be less pronounced if the first upper furrow is thrown downhill and the next furrow backfurrowed into it. Furrows along the lower line are thrown downhill to start the ridge, and the return furrows are thrown uphill against the upper line. After about three rounds have been plowed in this manner (fig. 3, *B*), the first round is made with the V-drag moving the loosened soil downhill against the lower line (fig. 3, *C*). Subsequent plowing and dragging are continued alternately until the ridge is partly formed and the channel plowed out except for a 2- or 3-foot balk at the center. Except for about one trip in which soil is moved toward the upper edge of the channel, drag work is concentrated on forming the ridge from the upper side. At least one furrow is plowed ahead of each complete round with the drag.

The second plowing consists of backfurrowing to the ridge (fig. 3, *D*), and about two rounds are made before the drag is used. Plowing toward the ridge from both sides is continued, followed by alternate rounds with the V-drag (fig. 3, *E*) on the upper side until the balk is plowed out and the soil moved onto the ridge. After construction with the drag is completed (fig. 3, *F*) the channel can be improved by plowing it out with the one-land method, shown in figure 5.

Figure 3

Terrace construction with plow and V-drag: *A*—Plow furrows marking the center and the upper and lower limits of the channel, *B*—first plowing, consisting of plowing the channel out, *C*—moving soil into the ridge with V-drag in conjunction with first plowing, *D*—second plowing, consisting of bedding to the ridge, *E*—moving soil into the ridge with V-drag in conjunction with second plowing, *F*—terrace section after drag operation.

One-Way Disk Tiller

In some areas terraces are constructed with a farm tractor and one-way disk tiller. A minimum 20-foot land is bedded by backfurrowing to form the terrace ridge. The center of this land should be approximately 10 feet below the surveyed channel line (fig. 4, *A*). This land is rebedded two or more times to develop height and size of the ridge (fig. 4, *B*). When the soil is dry and pulverizes readily, it is often desirable to allow the loose soil to settle before further plowing is attempted. Under favorable soil and moisture conditions, the terrace ridge can be rebedded without delay.

The terrace is completed with the disk tiller (fig. 4, *C* and *D*) by the one-land method of plowing out the channel to at least 20 feet.

If a small blade grader is available it may be used to advantage in conjunction with the disk tiller, as illustrated by the two lower pictures on the back cover. When this combination is used the construction procedure is similar to that commonly followed when the plow and V-drag are used.

Figure 4

Terrace construction with one-way disk tiller: *A*—First trip bedding terrace ridge, B—rebedding terrace ridge, *C*—first trip plowing out terrace channel, *D*—completed cross section.

Small-Blade Terracers

FARM TRACTORS and small-blade terracers or graders can also be used effectively for terrace construction. The same general procedure that has been developed for larger equipment of this type is followed except that more rounds are required, and some preliminary soil preparation may be necessary. Where soil penetration is difficult, an area at least 10 feet wide astride the channel line should be loosened with such equipment as a plow, disk, or ripper.

The first trip with the terracer is made with the point of the blade cutting approximately 3 feet below the surveyed channel line. The blade is set at an angle to insure proper scouring, and the heel is raised to obtain maximum ridge height (fig. 6, *A*). Subsequent cuts 12 to 15 inches wide are made in a similar manner until the channel line is reached.

The heel of the blade is lowered on the next trip to move the loose soil from the channel section to the base of the ridge (fig. 6, *B*). This soil is then deposited on the ridge (fig. 6, *C*). The process of "heeling down" in the channel and moving the soil (fig. 6, *D* and *E*) to the ridge is continued until adequate capacity with a broad, flat channel is secured (fig. 6, *F*). The shape of the channel can be improved further by the one-land method of plowing (fig. 5).

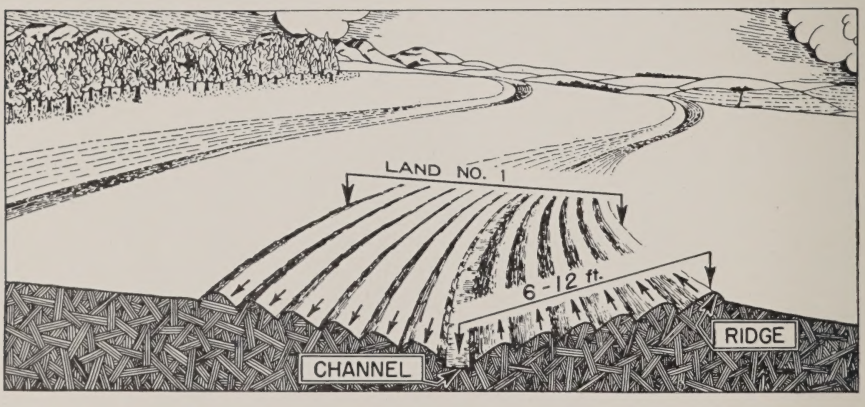

Figure 5 **The one-land method of plowing out terrace channels. The land is laid off and plowed out so that the dead furrow will fall at the desired center of channel.**

Figure 6

Constructing terraces with farm tractor and small blade terracer: *A*—First round moving soil downhill into ridge, *B*—moving loose soil from channel against base of ridge, *C*—placing soil on ridge, *D*—developing channel section with "heel down" cut, *E*—subsequent movement of loose soil on ridge, *F*—completed terrace section.

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